

An extraordinary phenomenon of thunder and lightning occurred last night, which is of such rare occurrence in this region that the oldest inhabitants assured me to-day that they never experienced anything like it, some of them having lived around here since 1845.

Last evening at about 10:25, distant horizontal flashes of lightning commenced at the southeast, temperature 63°; no thunder was audible and the lightning was frequent, extending over a long range from extreme southeast to nearly east. This continued until after 11:15 p. m., when I retired. No doubt this must have continued further, for at 12:20 a. m. I was awakened by roaring thunder. Getting up at once, I watched the southeast and east horizon, which I viewed from this station, as formed by the Cascade Mountains, just about 50 miles distant.

Such intense flashes of lightning, illuminating the sky and country to the extent of almost bright sunlight, I have never before seen. What seemed to me very strange, however, was the fact that not once did the streaks of lightning form zig zags like those seen by me in the East and in Europe, in my youth. Last night's flashes were all vertical and inclined about 10° down to points either just west or just east of the Cascade Range. The streaks of lightning were mostly like half a spiral or corkscrew. But three times I saw a perfect "n" and once an "m." The thunder peals which followed were tremendous. I must remark that for half an hour I invariably counted intervals of from twenty to twenty-three seconds elapsing between the lightning and the thunder; for over half an hour the flashes occurred regularly every twenty-five to thirty seconds. The rain here during two hours amounted to only 0.29. At 1:15 a. m. the phenomenon ceased. The entire storm lasted two hours and fifty minutes, the longest continuous lightning and thunder I ever experienced.

METEOROLOGY IN FRENCH INDO-CHINA.

We copy from the *Annales de Géographie*, March, 1900, IX, p. 178, the following paragraph which shows that meteorological observations are now well established in a portion of the world from which we have hitherto received very fragmentary information.

For a long time past we have regretted the almost complete absence of meteorological observations in French Indo-China. This gap was especially to be lamented, from a scientific point of view, because it prevented us from extending our studies over one of the most interesting portions of Asia and, from a practical standpoint, because a knowledge of the climate is of primary importance for hygiene, colonization, and the rational utilization of the soil. The Central Meteorological Bureau of France had several times opened negotiations with the successive governors of Indo-China for establishing an adequate network of meteorological stations in that immense region, and the project was for a short time on the point of being realized by M. de Lanessan, when the latter was obliged to leave our colony. The project has just been revived and brought to a happy conclusion, thanks to the enlightened initiative of the present Governor-General M. P. Doumer.

The network of stations for the year 1900 has been constituted as follows, the principal stations being printed in capital letters:

In Cochinchina: SAIGON, CAPE SAINT-JACQUES, POULO-CONDORE, Ong-Yem, Tay-ninh, and Soc-trang.

In Annam: NHA-TRANG, LANGSA, TOURANE, Quin-hone, Hué, Dong-Hoi, Vinh, and Than-hoa.

In Tonkin: HANOI, Haiphong, Quang-Yen, Hon-gay, Mon-cay, Lang-sou, Cao-bang, Lao-kay, Ha-giang, Bac-kan, and Van-bu.

In Laos: VIEN-TIANE, Luang-Prabang, Savannakhek, Khong, and Attapeu.

In Cambodge: PNOM-PENH, Kampot, and Pursat.

In Yunnan and China: YUNNANSEN, Semaio, Mongtze, Lang-tchéou, Pakhoi, Hoi Hou, Kouang-Chau-Wan (Kouang-tchéou Ouan).

In the Gulf of Siam: Chantaboun, Bangkok, and Singapore.

To these stations will be added a first class observatory, which will probably be established near Haiphong and where regular magnetic observations will also be made. All the scientific outfit of this observatory is due to the well-known liberality of M. Bischoffsheim; the greater number of these instruments have just been sent there.

It will thus be seen that this network of stations has been well conceived and very interesting results may be expected from the observations that have just begun to be made there. There are only two other things to be wished for, viz, that the new establishment may be permanent, and that on the other hand the means may be found for publishing the observations regularly—the only means of rendering them really valuable.

A RAIN OF SMALL FISH.

Mr. J. W. Gardner, voluntary observer at Tillers Ferry, S. C., reports that during a heavy local rain about June 27 there

fell hundreds of little fish (cat, perch, trout, etc.) that were afterwards found swimming in the pools between the cotton rows in a field belonging to Mr. Charles Raley.

It is a well-known fact that in such rains all sorts of foreign objects, whether sticks or stones, frogs or fish, or even debris of destroyed houses and crops, occur occasionally not only in America but in Europe and elsewhere. It is very rare that we are able to trace these objects back to their sources, but there can be no reasonable doubt that they were carried up from the ground by violent winds, such as attend thunderstorms and tornadoes. Light objects, such as sheets of paper, have been identified as falling at points twenty or fifty miles distant from their starting point, but it is hardly likely that heavier objects, such as fish, could be carried so far without coming to the ground.

SUN SPOTS AND METEOROLOGY.

The question as to a possible relation between sun spots and terrestrial meteorology seems to have been started by Riccioli in 1651, as soon as physicists and astronomers fairly began to follow in the footsteps of Galileo. In 1800 Herschel suggested a relation between sun spots and the crops as depending upon the temperature of the earth. The memoirs of Fritsch, Vienna, 1854; Gautier, 1844; Arago, 1855; Zimmermann, 1856; Wolf, 1859, represent about all that was known on the subject before 1870.

In 1869, by comparing Wolf's sun-spot figures with various meteorological tables, I satisfied myself that the variations of solar radiation affect the terrestrial temperature so slightly that they are generally marked by local climatic peculiarities, but a special study of the observations on the summit of the Hohenpeissenberg near Munich (see *American Journal of Science*, 1870, vol. 50, p. 345) showed that the daily 2 p. m. observation gave a clear indication of the direct heating power of the sun and that the midday air temperature decreased at the rate of 0.008° R. for each unit of Wolf's tabular sun-spot numbers. There was also an indication of a period embracing about five sun-spot periods or 55.5 years, and a further possibility that the periodic changes in spots may have to do with planetary tides in the solar atmosphere.

Dates of maximum and minimum temperature.		Dates of maximum and minimum sun spot.
In the Tropics.	Beyond the Tropics.	
.....	1815 5	1816 8*
1823 5*	.....	1823 2
.....	1825 8*	.....
1830 1	.....	1829 5*
.....	1831 9	.....
1833 1*	.....	1833 8
.....	1834 2*	.....
1836 4	.....	1837 2*
.....	1837 8	.....
1842 8*	.....	1844 0
.....	1846 4*	.....
1847 6	.....	1848 6*
.....	1850 3	.....
1854 7*	.....	1856 2
.....
.....	1861 6	1860 2*
.....	.....	1867 2
.....	1868 7*	.....

*The maxima are indicated by the star.

Koeppen states that at that same time he began collecting his material for an investigation on the broadest possible foundation, the results of which he published in the *Meteorologische Zeitschrift*, 1873, Vol. VII, pp. 241 and 257. He collated all available series of observations at stations embracing three years or more of continuous work and wove them into a homogeneous system of groups, twenty-five in all, representing the years 1731-1871 and covering the whole